

Sensitivity analysis of climate change risk assessment

Study of parameters variation in hazard indicators

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- ▶ Risk: potential for adverse consequences for human or ecological systems [...]
- ▶ Climate Change Risk Assessment (CCRA)

The problem

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- ▶ The choice of indicators is arbitrary
- ▶ Sensitivity analysis of indicators within the hazard determinant

► Torino Airport

Case study

- ▶ Torino Airport
- ▶ Hazard drivers: heat wave, heavy precipitation

- ▶ Climatological baseline: ERA5
- ▶ Climate projections: NEX-GDDP-CMIP6

- ▶ Organisation: European Centre for Medium-Range Weather Forecasts
- ▶ Data type: reanalysis
- ▶ Spatial resolution: $0.25^\circ \times 0.25^\circ$
- ▶ Time frequency: hour

- ▶ Organisation: NASA Earth Exchange
- ▶ Data type: statistically downscaled bias-corrected climate projections
- ▶ Spatial resolution: $0.25^{\circ} \times 0.25^{\circ}$
- ▶ Time frequency: day
- ▶ Historical period 1950-2014, projection period 2015-2100
- ▶ Model: EC-Earth3
- ▶ Scenario: SSP1-2.6, SSP2-4.5, SSP5-8.5

- ▶ Box of 3×3 grid points centred at the coordinates of the airport

Temporal frame

- ▶ Baseline period: 1994-2023
- ▶ Time horizons: 2021-2040, 2051-2070, 2081-2100

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- ▶ Fix exposure and vulnerability from literature
- ▶ Evaluate risk

1. Regrid ERA5

Preprocessing

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2. Aggregate ERA5 at daily frequency

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3. Align NEX-GDDP-CMIP6 timestamps

Preprocessing

1. Regrid ERA5
2. Aggregate ERA5 at daily frequency
3. Align NEX-GDDP-CMIP6 timestamps
4. Bias adjustment

Evaluation of hazard indicators

1. Define intervals of parameters

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3. Temporal aggregation

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4. Risk evaluation

Next steps

- ▶ Uncertainty evaluation
- ▶ Evaluate risk with non-linear relations among hazard indicators and among determinants
- ▶ Extend analysis to Bologna's and Ciampino's airports